(No Model.) 3 Sheets—Sheet 1.

A. B. FRAME.

CURRENT MOTOR.

No. 590,142. Patented Sept. 14, 1897.

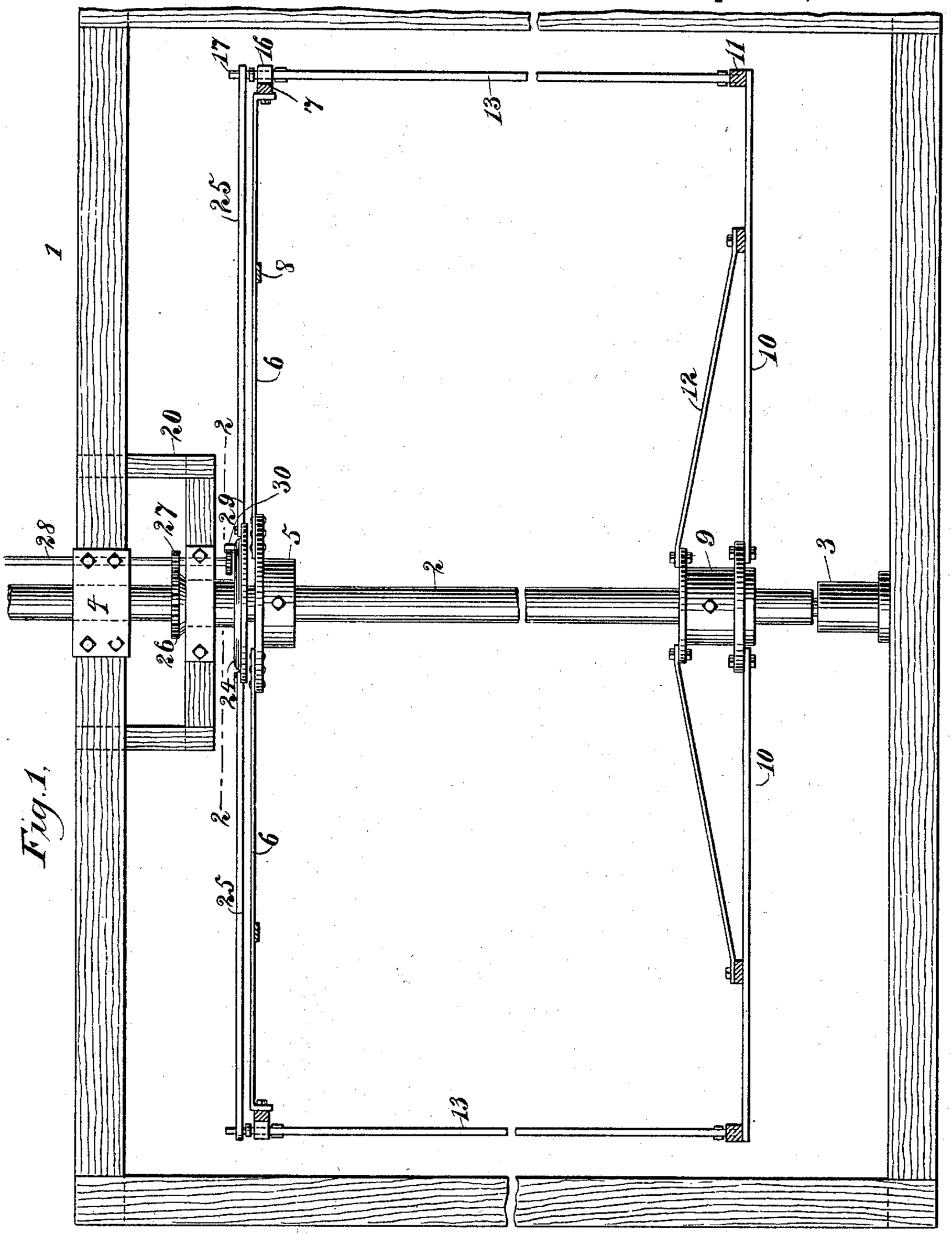

Fig. 1.

WITNESSES:

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C. R. Ferguson

INVENTOR

A. B. Frame.

BY

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

A. B. FRAME.

CURRENT MOTOR.

No. 590,142. Patented Sept. 14, 1897.

Fig. 3.

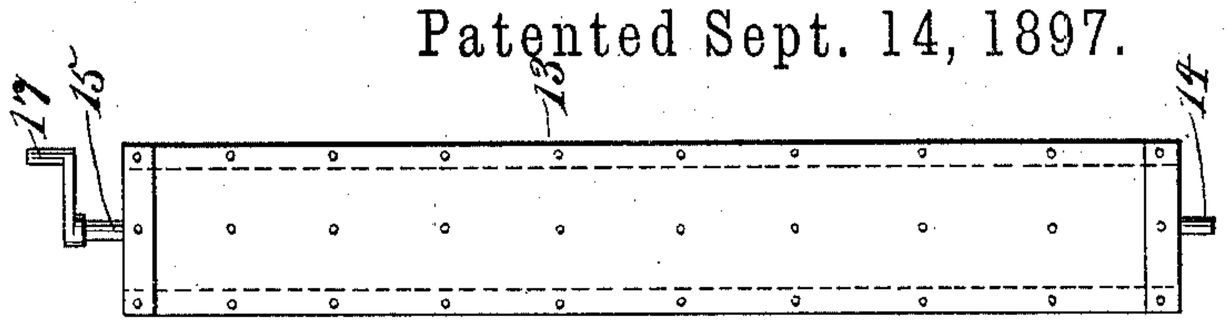
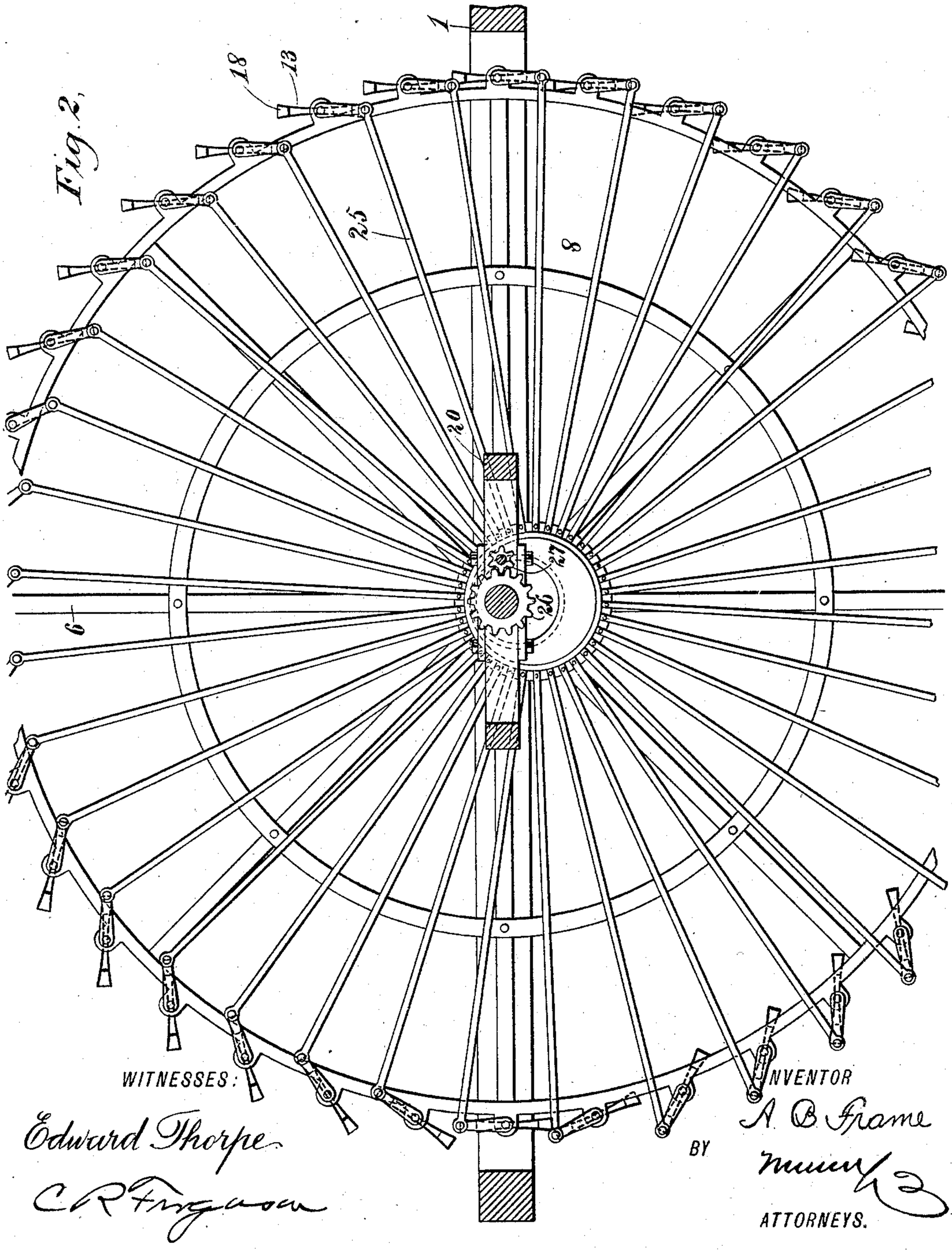


Fig. 2.



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(No Model.)

3 Sheets—Sheet 3.

A. B. FRAME.

CURRENT MOTOR.

No. 590,142. Patented Sept. 14, 1897.

Fig. 5.

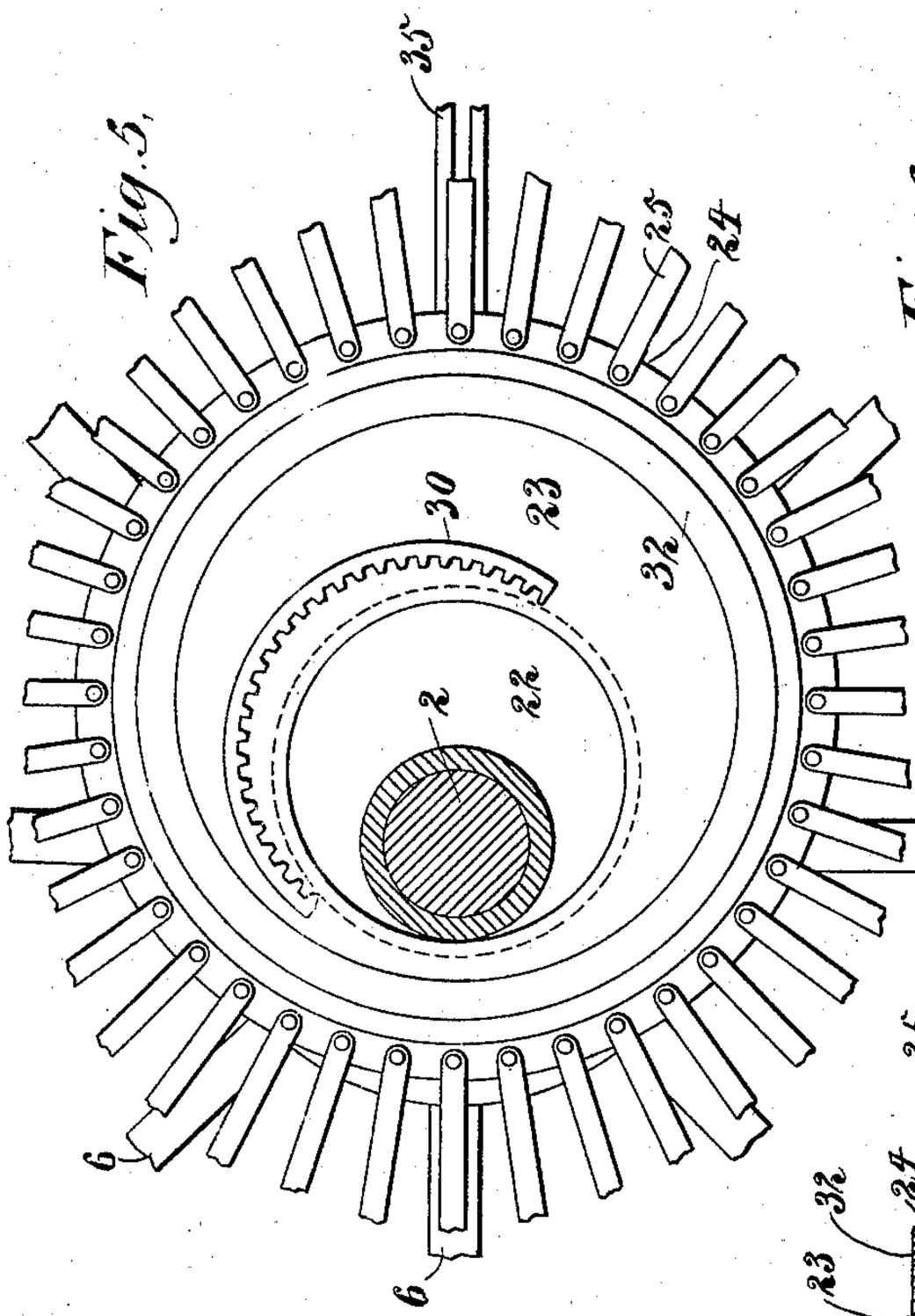


Fig. 6.

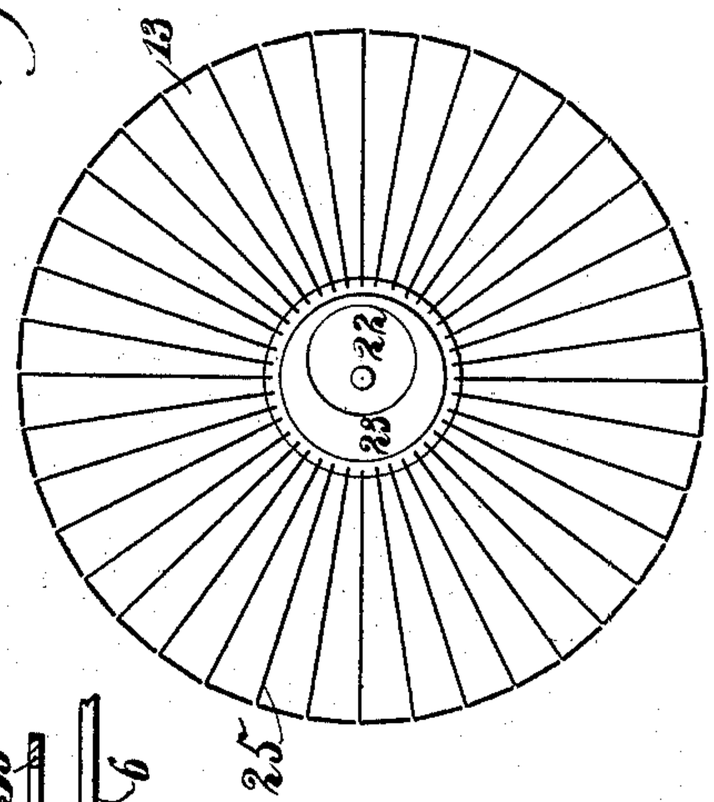
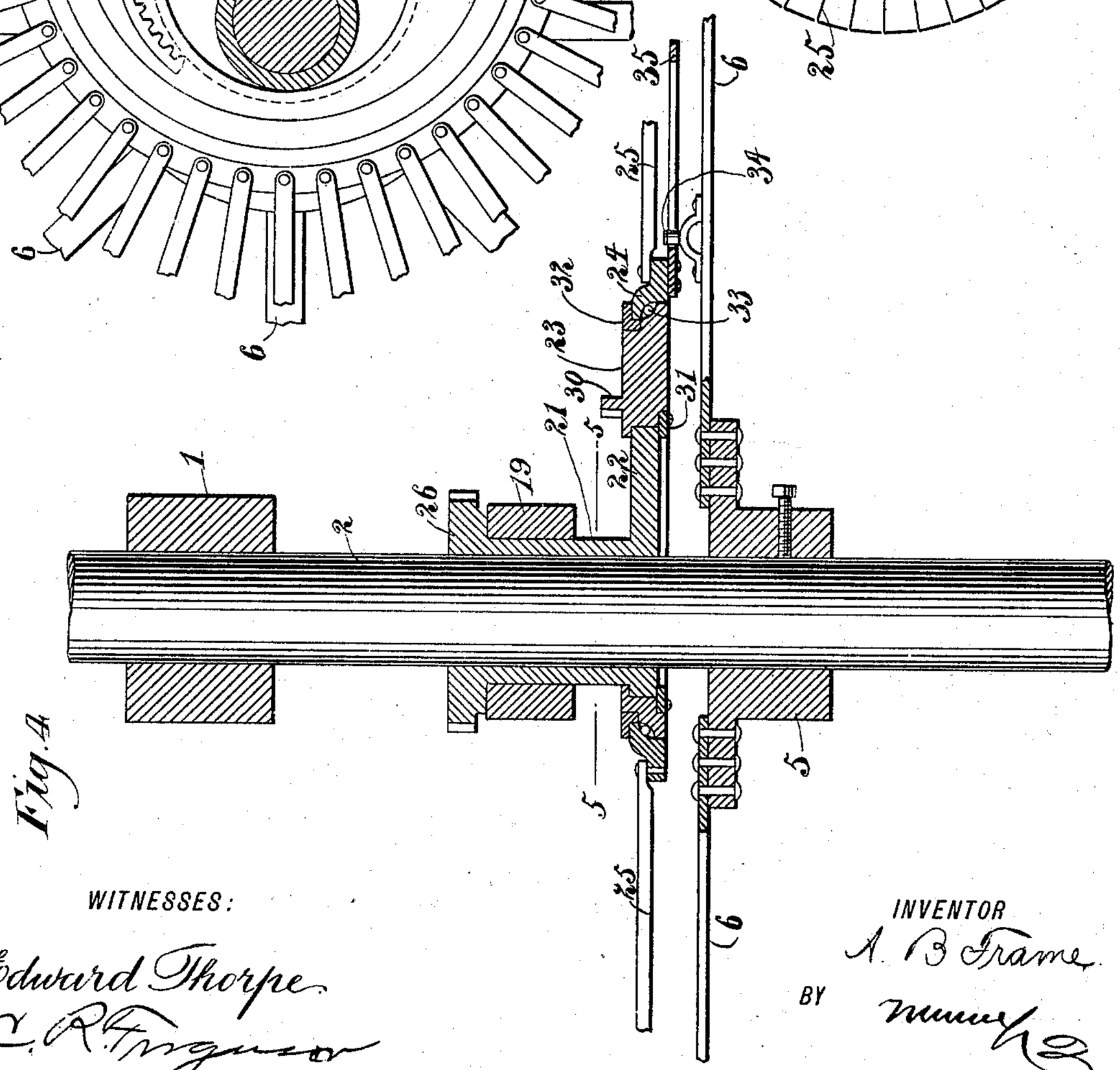


Fig. 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

ASA B. FRAME, OF BOYDEN, IOWA.

CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 590,142, dated September 14, 1897.

Application filed June 15, 1896. Serial No. 595,571. (No model.)

To all whom it may concern:

Be it known that I, ASA B. FRAME, of Boyden, in the county of Sioux and State of Iowa, have invented a new and Improved Current-Motor, of which the following is a full, clear, and exact description.

This invention relates to motors or power-wheels designed to be operated by the current of a stream of water in which they are placed for operating pumps or other machinery on land; and the object of the invention is to provide a wheel so constructed that the action of the current will bear both upon the receiving and the discharge side of the wheel, thus utilizing the current power to its fullest capacity.

I will describe a current-motor embodying my invention, and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of a current-motor embodying my invention with certain parts omitted to more clearly show other parts. Fig. 2 is a top plan view thereof and a section on the line 2 2 of Fig. 1. Fig. 3 is an elevation of one of the blades employed. Fig. 4 is a vertical section, on an enlarged scale, of a portion of the motor. Fig. 5 is a section on the line 5 5 of Fig. 4, and Fig. 6 is a plan view illustrating the wheel when in its closed or inoperative position.

The motor comprises a rectangular frame 1, designed to engage its end pieces with suitable supports or grips located in a stream of water. Vertically mounted in this frame 1 is a power-wheel shaft 2, having a step-bearing at its lower end in a cup 3, secured to the lower bar of the frame 1, and also having a bearing through a box 4, secured to the upper bar of the said frame. The upper end of this shaft 2 will receive a band or other wheel for connection with a device to be driven or operated.

Mounted rigidly on the shaft 2 near it upper portion is a sleeve 5, having an outwardly-extending annular flange to which the inner ends of radiating spokes 6 are secured. The outer ends of said spokes 6 are turned downward and are secured by bolts or otherwise to a peripheral ring 7, and between the outer and inner ends of these spokes 6 a bracing-ring 8 is secured. To the lower portion of the shaft 2 is rigidly secured a sleeve 9, having an annular flange to which the inner ends of radiating spokes 10 are secured, the outer ends of said spokes 10 being secured to a peripheral ring 11. These spokes 10 are rigidly braced by means of rods 12, secured at one end to the spokes and at the opposite end to the upper portion of the sleeve 9.

Blades 13 are supported by the rings 7 and 11. These blades 13 are designed to have an oscillating motion with relation to the rings. They are therefore provided at their lower ends with lugs 14, adapted to engage in bearings or sockets formed in the ring 11, and at their upper ends they are provided with shafts 15, having bearings through lugs 16, extended outward from the ring 7, and at the upper ends of these shafts 15 crank-arms 17 are secured for engagement with operating-rods, as will be hereinafter described.

The blades 13, as clearly illustrated in Figs. 2 and 3, have their side portions made of suitable sheet metal and concaved to such an extent that their central portions will meet, and these central meeting portions may be secured together by means of rivets. Between the outer edges of the side plates are riveted metal bars 18.

I will now describe a means for imparting an oscillating or feathering motion to the blades as the wheel revolves.

Surrounding the shaft 2 and adapted for rotary motion in a bearing 19, formed through the lower bar of a hanger 20 on the frame 1, is a sleeve 21, which at its lower end has an eccentric disk 22, the periphery of which is engaged by an eccentric ring 23, which in its turn is engaged by an eccentric strap 24, from which rods 25 extend to connections with the crank 17. It will be seen that I thus provide a compound eccentric mechanism for operating the blades.

On the upper end of the sleeve 21 is a gear-wheel 26, meshing with a pinion 27 on the shaft 28, extended upward through the frame and also through the cross-piece of the hanger 20. At its lower end the shaft 28 is provided

with a pinion 29, engaging with a curved rack 30, formed on the upper side of the eccentric ring 23. By means of this gearing connection the several blades may be closed or turned to an inoperative position, as indicated in Fig. 6, thus of course stopping the motor, that is—by rotating the shaft 28 the eccentric 22 will be rotated in one direction and the eccentric ring 23 will be rotated in an opposite direction, and when thus turned the center of the eccentric ring 23 will be coincident with the axis of the shaft 2. Of course the reverse movement of the shaft 28 will open the blades or put the eccentrics in a position for operation.

I have here shown the eccentric ring 23 as provided at its upper inner side with an annular flange to engage over the edge of the eccentric 22, and it may be secured in place by means of a removable ring 31, attached to the ring 23 and engaging the end surface of the eccentric 22. The eccentric strap 24 is provided with an inwardly-extended annular flange to engage over a flange of the ring 23, and which is held in place by means of a ring 32, secured to the ring 23 and engaging over the strap 24. Preferably I place antifriction-balls 33 between the flanges of the parts 23 24.

It will be understood that when the motor is in operation the eccentrics 22 and 23 will remain stationary and the strap 24 will rotate with the wheel. In order to carry the strap 24 with the wheel, I attach a lug 34 to one of the spokes 6. This lug extends through a longitudinal slot formed in an arm 35, attached to and extended outward from the eccentric strap. Obviously this lug by engaging the walls of the slot in the arm 35 will cause the eccentric strap to move with the wheel, and the longitudinal slot will allow for the changes in projection of the eccentric. As the wheel turns under the action of the current each gate or blade gradually assumes an angle of about forty-five degrees when at a point or side of the wheel where the current is received, and also at the side where the water is discharged. Thus it will be seen that the current operates both in entering and discharging.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A current-motor, comprising a vertical shaft mounted to rotate, a wheel carried by said shaft and having spokes extending radially from said shaft near its upper and lower end and oscillating blades supported by said spokes, an eccentric disk surrounding the shaft, an eccentric ring engaging with said disk, an eccentric strap engaging with said ring, rods extending from said eccentric strap to crank-arms on the said blades, and means for connecting the said eccentric strap and wheel, whereby the said strap will rotate with the wheel, substantially as set forth.

2. A current-motor, comprising a vertical shaft, a wheel carried by the shaft and provided with pivoted blades, an eccentric disk surrounding the shaft, an eccentric ring engaging the disk, an eccentric strap engaging the ring and connected with the wheel, connections between the said strap and blades, and means for rotating the said disk and ring in opposite directions, substantially as described.

3. A current-motor, comprising a frame, a vertical driving-shaft supported therein, a sleeve secured to said shaft near its upper portion within the frame, spokes extended radially from said sleeve, a peripheral ring secured to the outer ends of said spokes, a sleeve attached to the shaft near its lower end, spokes radiating therefrom, a peripheral ring secured to said spokes, blades supported by and adapted to oscillate with relation to said two rings, crank-arms on the upper extended ends of the upper journals of said blades, a sleeve surrounding the driving-shaft and supported by the frame, an eccentric disk on the lower end of said sleeve, an eccentric ring engaging with said disk, an eccentric strap engaging with said ring, rods extended from the strap to the crank-arms, and means for rotating the eccentric disk and the eccentric ring in opposite directions with relation to each other, substantially as specified.

4. A current-motor, comprising a vertical shaft, a blade-carrying wheel mounted to rotate therewith, a sleeve surrounding the upper portion of said shaft and having a gear-wheel on its upper end, an eccentric disk on the lower end of said sleeve, an eccentric ring engaging with said disk, a curved rack on the upper surface of said ring, an eccentric strap engaging with the ring and having antifriction-bearings thereon, connections between the said wheel-blades and the eccentric strap and a shaft having pinions to engage respectively with the gear on the sleeve and with the rack on the eccentric ring, substantially as specified.

5. A current-motor, comprising a frame, a vertical shaft supported therein, spokes radiating from said shaft and supporting blades, an eccentric surrounding the shaft, an eccentric strap thereon, rods connecting the eccentric strap and the said blades, a lug mounted on one of the spokes, and an arm extending from the eccentric strap and having a longitudinal slot with which said lug engages, whereby the rotation of the said shaft and spokes carried thereby will rotate the said eccentric strap, substantially as specified.

ASA B. FRAME.

Witnesses:
M. B. BENNETT,
JNO. B. MAYER.